Green Construction

An Occupational Outlook for San Diego County

Conducted for The San Diego Workforce Partnership and Cuyamaca College

December 2010

GREEN LMI [bw] RESEARCH PARTNERSHIP

46 Northbridge Road, Mendon, MA 01756 | T (617) 395-8898 | F (617) 906-5382 | www.greenlmi.com

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EXECUTIVE SUMMARY

San Diego County has lost nearly 40,000 construction jobs in the last five years. Only one-third of those jobs are expected to return by 2015, though "green construction" jobs are expected to grow at an above average rate. The San Diego Workforce Partnership (SDWP) and Cuyamaca College commissioned this study to examine the growing demand for green construction workers and identify the training these workers will need to be successful in the field.

The study surveyed 159 San Diego-area construction firms working in the construction subfields most likely to perform green construction, namely residential remodelers and roofing, electrical, and plumbing and HVAC contractors. Firms operating in these areas are largely optimistic about hiring, with nearly 30% expecting to add new permanent employees in the next year and fewer than 4% anticipating layoffs. Overall, these employers expect to grow their ranks by 5.5% in the coming year.

Despite working in the industries most likely to be involved in green construction, less than one-third of the firms have actually worked on green building projects, and the vast majority was unable to name even one government incentive program designed to encourage green building. Of the firms that do engage in green construction, three-quarters report making less than half their revenue from it. They do, however, seem to employ workers with green skills, with half saying that 75-100% of their employees work on green projects. While green construction jobs currently represent only 13% of the jobs in the surveyed sectors, these jobs are growing at a rate far above average—an estimated 10.1% over the next year.

The study next examined the expected demand for the professionals most likely to be employed in green construction projects: home performance auditors, raters, and estimators; plumbers; insulation workers; electricians; HVAC technicians; and carpenters. All of these fields anticipate job growth in the next 12 months with electricians, carpenters, and HVAC technicians expected be in the highest demand.

The surveyed employers report that they do not have significant difficulty finding qualified workers to fill their jobs, though some positions—most notably carpenters—are harder to fill than others. Despite the lack of difficulty in filling open positions, employers do report that new hires frequently lack on-the-job experience and other critical skills. This is likely why most employers provide formal on-the-job training, employer-paid outside training, and flexible hours for employees enrolled in training programs.

In light of these findings, the study concludes SDWP and Cuyamaca College should (1) collaborate with sustainability and energy industry stakeholders to promote green incentive programs to help fuel demand for green construction, (2) educate employers about the training opportunities available at SDWP and Cuyamaca College to meet employers' need for workers to receive additional training, and (3) ensure their training programs provide on-the-job experience so participants are prepared to be successful in the green construction industry.

INTRODUCTION

Over the past several years, America has witnessed an unprecedented shift in its collective opinions on climate change, sustainability, and environmental protection. Whether reviewing consumer choices, venture capital investment trends, or internal corporate policies, it is clear that the United States has embraced the "green" movement. These new trends are not only changing the way U.S. companies do business, but are also generating excitement and interest in the jobs created by the growth of green industries.

Nowhere is this more evident than California, with progressive policies to curb and mitigate environmental degradation, a large and diverse state economy and workforce, and a forward-thinking electorate. California has always been seen as a leader in environmental movements—particularly with regard to controlling emissions—and its leadership position was reasserted in the November 2010 election by defeating attempts to overturn the aggressive building standards promulgated under Assembly Bill 811, California's climate change law.

San Diego's cleantech cluster—led by its industry association, CleanTECH San Diego—was recently ranked third in the nation and seventh in the world by Sustainable World Capital, which reviews investments and policies to determine its rankings.[1] However, the slow economic recovery, uncertainty regarding future incentives and government spending, and the lack of a comprehensive national energy policy are all potential barriers to future growth. Furthermore, despite strong investments and public policy commitments, there have been few studies examining the impact these investments and commitments are having on the local labor market. In other words, far too many people are still asking, "Where are the jobs?"

As of October 2010, the California Employment Development Department reported San Diego County's unemployment rate at 10.2%, down nearly a percentage point since the spring but still at historically high levels. According to data from Economic Modeling Specialists, Inc. (EMSI), San Diego County has lost nearly 40,000 jobs in its construction sector, or nearly one-third of all of its construction jobs, since 2005. These staggering statistics have led policymakers to focus their attention on so-called "green construction" in the hope that stimulating sustainable redevelopment and energy-efficient upgrades will yield new employment opportunities in this distressed sector.

In 2009, the San Diego Workforce Partnership and Cuyamaca College each received grant funding from the California Energy Commission and the California Workforce Investment Board to provide training opportunities leading to careers in green construction. They have commissioned this outlook of San Diego's green construction occupations so they can better understand the labor market demand, skill profiles, and employer preferences in the sector and enhance their training programs accordingly.

Information was gathered for this report in three phases. The first phase included a review of secondary data, relying on O*NET green building occupational categories and compiled by EMSI to determine the largest industries and occupations within the cluster for review. The second phase included conducting ten executive interviews with regional

[1] *See http://cleantech.com/research/*

employers, industry associations, and policymakers to better understand the forces affecting the economy and workforce of the construction sector in San Diego. The third phase included a representative survey of 159 construction employers drawn from the subsectors most likely to work in green construction.

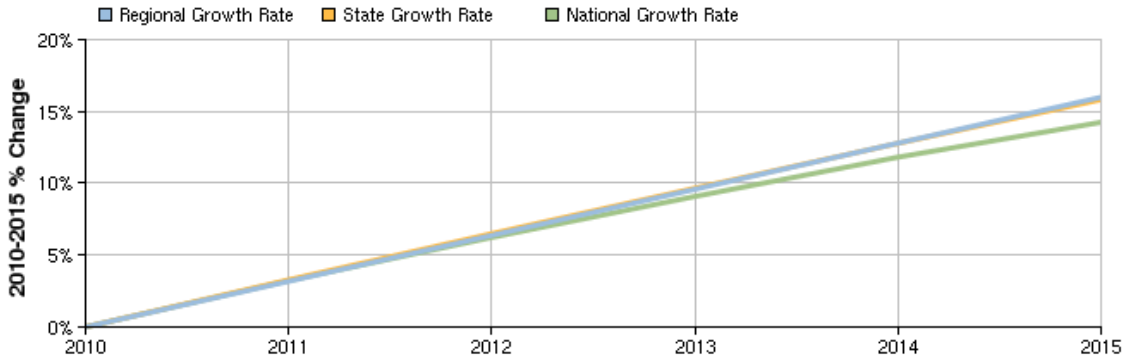
For the purposes of this study, “green construction” refers to building construction and remodeling that use sustainable products and/or result in the more efficient use of natural resources, including energy and water.

INDUSTRY OUTLOOK

LONG-TERM INDUSTRY OUTLOOK: SECONDARY DATA

The general construction industry in San Diego County has lost nearly 40,000 jobs over the last five years, representing a drop of over 30 percent over the period. However, according to EMSI, San Diego's construction industry is expected to grow by 16 percent over the next five years, adding back a third, or about 13,000 jobs, by 2015. These jobs will come from a wide array of construction industries, led by residential remodelers and electrical contractors. The new residential housing construction industry, on the other hand, is still expected to lose about 800 jobs over the next five years.[2]

Figure 1: 2010-2015 Industry Trends in San Diego County



[2] EMSI Complete Employment - 4th Quarter 2010

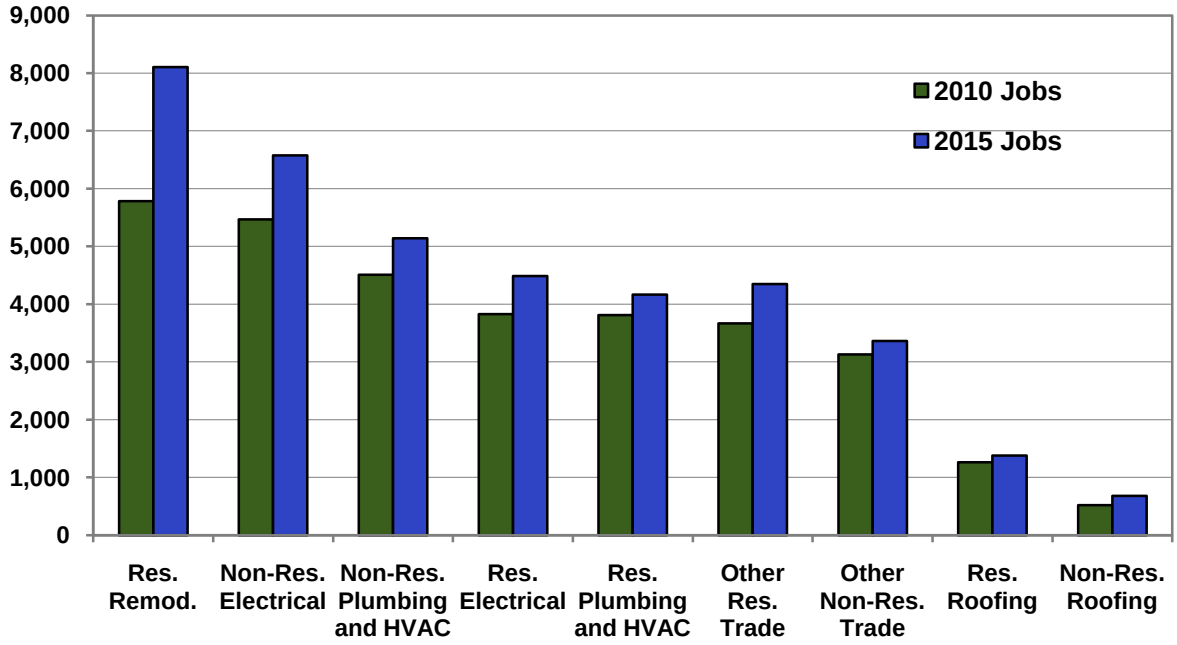
New green building materials and practices do not affect all construction industries equally, nor is growth anticipated across all subsectors of the cluster. In order to provide more detailed and specific information on green construction in the region, this report focuses on five construction subsectors from the North American Industry Classification System (NAICS). The employer sample developed for the survey was drawn from InfoUSA's proprietary eight-digit NAICS database, which is a subset of the firms included in the traditional six-digit NAICS database reviewed in the secondary data section of this report.

Table 1: Selected Green Construction NAICS Codes

NAICS Code	Description	
236118	Residential remodelers	
	23611823	Remodeling and repairing building contractors
	23611830	Sun rooms solariums atriums etc building
	23611836	General contractors-residential buildings
238160	Roofing contractors	
	23816001	Ceilings
	23816010	Roof maintenance
	23816011	Roof structures
	23816014	Roofing contractors
	23816015	Roofing siding and sheet metal work
238210	Electrical contractors	
	23821007	Electric contractors
238220	Plumbing and HVAC contractors	
	23822002	Air conditioning contractors and systems
	23822013	Energy management systems and products
	23822019	Heat pumps
	23822020	Heating contractors
	23822021	Heating specialties
	23822022	Heating systems-cleaning and repairing
	23822025	Plumbing contractors
	23822027	Plumbing heating and air conditioning
	23822032	Solar heating contractors
238990	All other trade contractors	
	23899018	Contractors

These industries are expected to grow at an even faster rate of nearly 20 percent over the next five years. As seen in Figure 2 below, the greatest opportunities in these industries are for residential remodelers, electrical contractors, and plumbing and HVAC contractors.[3]

Figure 2: 2010-2015 Trends in Potential Green Construction Industries



[3] EMSI Complete Employment - 4th Quarter 2010

SHORT-TERM INDUSTRY OUTLOOK: PRIMARY DATA

In order to get more accurate short-term data, this report includes survey responses from a representative sample of 159 firms in the region from the previously referenced NAICS codes.[4] As seen in Figures 3 and 4 below, the responses are from firms large and small, and from all over the county.

Figure 3: Survey Respondents by Firm Size

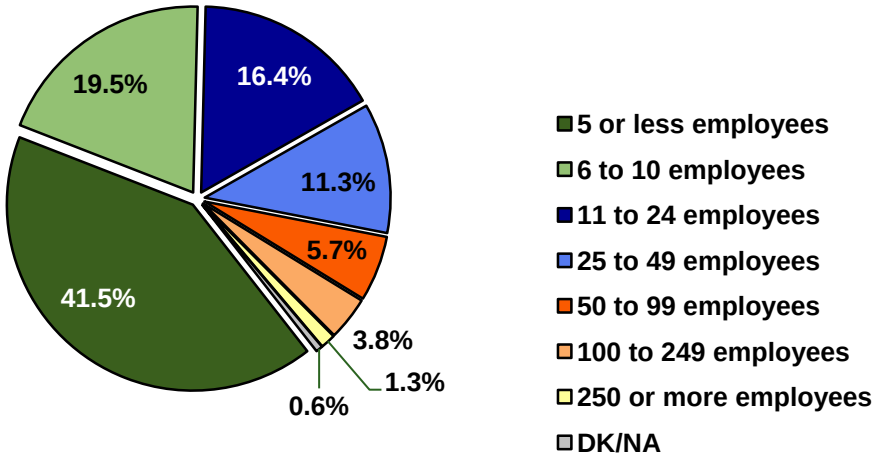
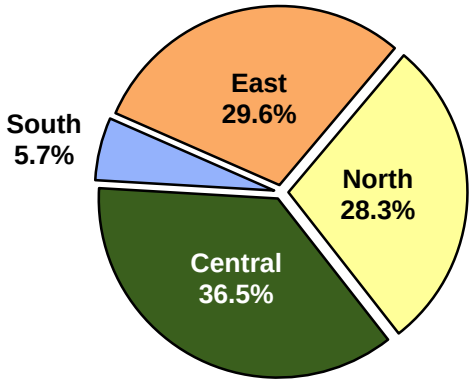


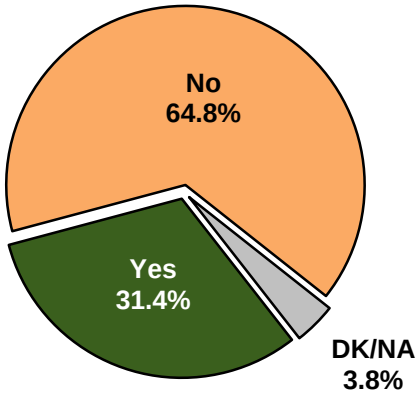
Figure 4: Survey Respondents by Geography



[4] Please refer to Appendix B for a description of the methodology for the primary research findings of this study.

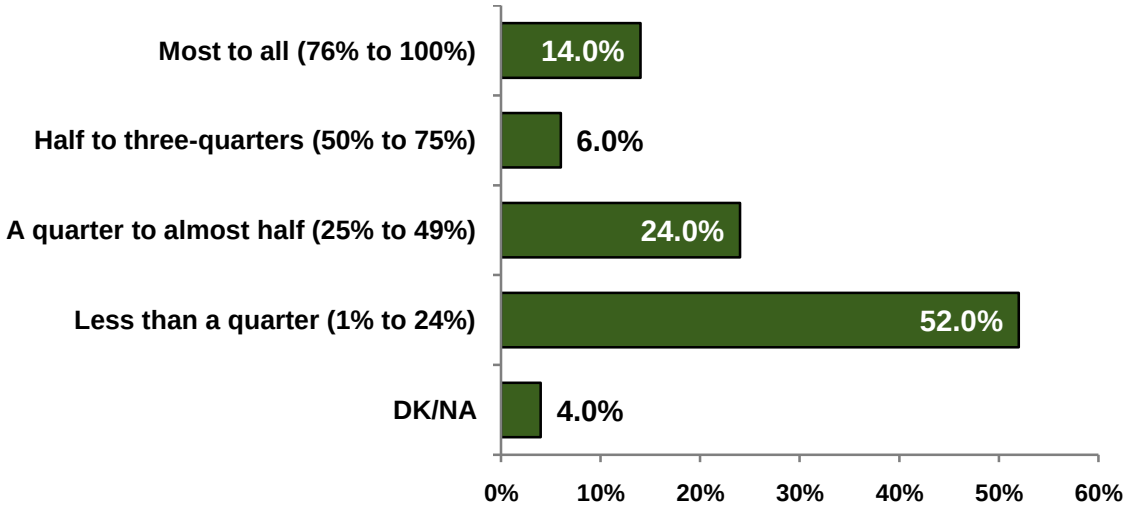
Interestingly, however, despite choosing only those industries most likely to be involved in green construction, fewer than one-third have actually worked on a green building project, as seen in Figure 5 below.

Figure 5: Percentage of Respondents Working on Green Building Projects



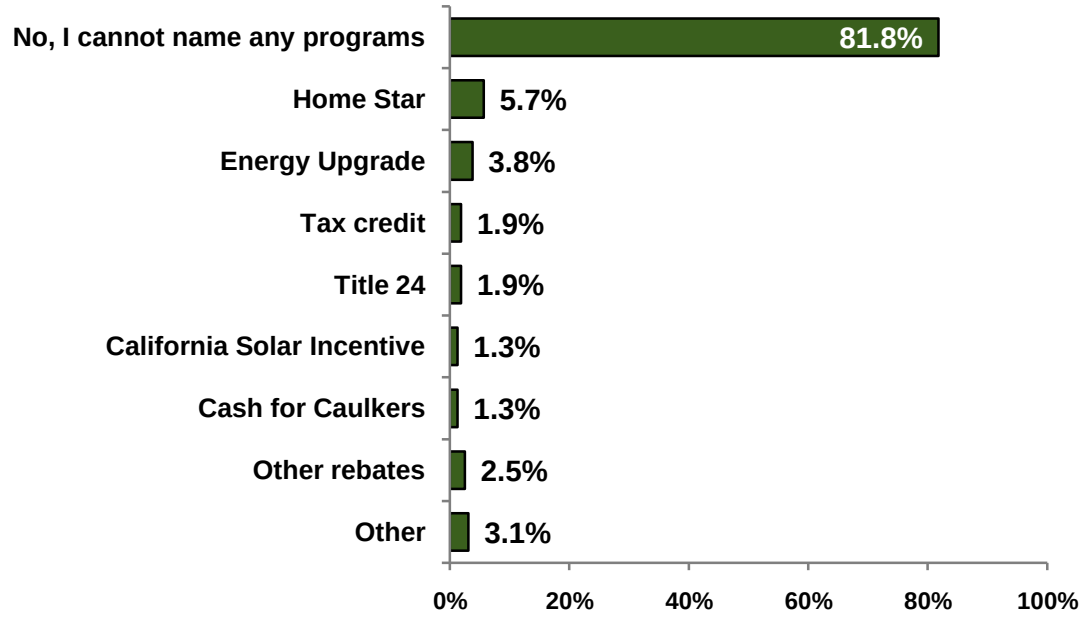
Of the firms that do work on green building projects, 76 percent receive less than half of their revenue from such projects, while 20 percent receive more (14% receive most to all).

Figure 6: Green Building Revenue (Percentages among Firms that Work on Green Building Projects)



Another surprising finding is that very few San Diego County construction firms were able to identify common green building incentive programs. For this question, firms were asked an unassisted question, meaning that the interviewer did not prompt respondents or test their knowledge by reading a list of programs. Rather, respondents were simply asked to list the programs that they were aware of, if any. Of the respondents who answered the question, nearly 82 percent were unable to name a single program.[5]

Figure 7: Green Building Program Knowledge



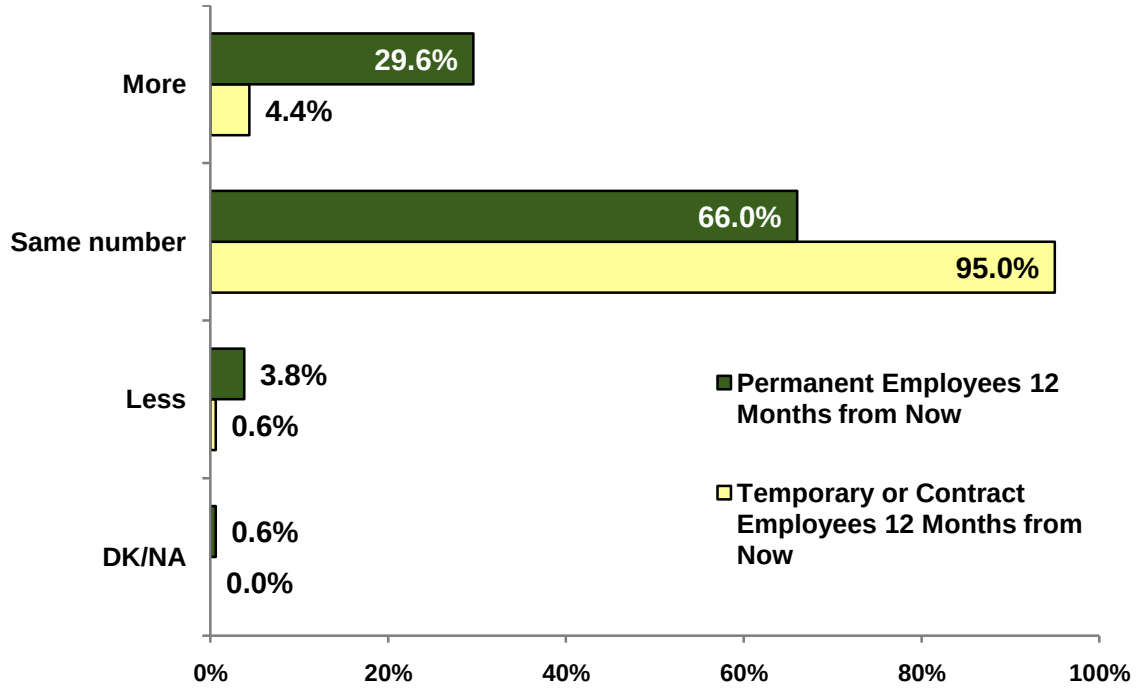
[5] For detailed information about energy efficiency and renewable energy incentive programs, see the California Center for Sustainable Energy's website at http://energycenter.org

EMPLOYMENT OUTLOOK

OVERALL EMPLOYMENT TRENDS

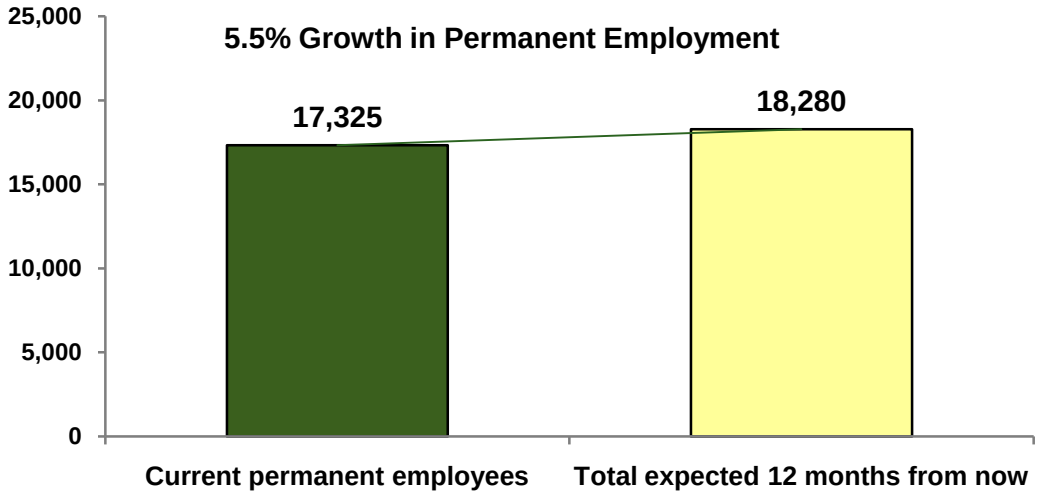
The sample of firms surveyed for this study represents over 17,000 workers at 1,176 firms in the region. These employers report optimism regarding hiring, with nearly 30 percent expecting to add new permanent employees (4.4% expect to add temporary employees), and fewer than four percent expecting to cut permanent jobs (0.6% expect to cut temporary workers).

Figure 8: 12-Month Industry Hiring Expectations



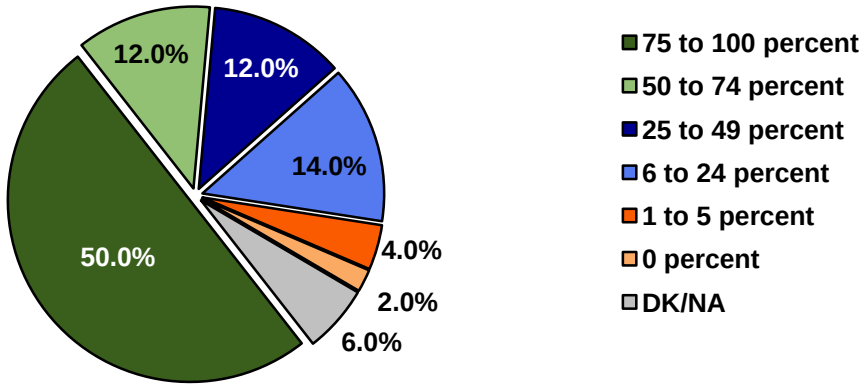
In terms of actual job creation and based on the survey responses, these sectors are expected to grow by 5.5 percent over the coming year, representing 955 new permanent jobs in the county over the next year.

Figure 9: 12-Month Permanent Employment Growth



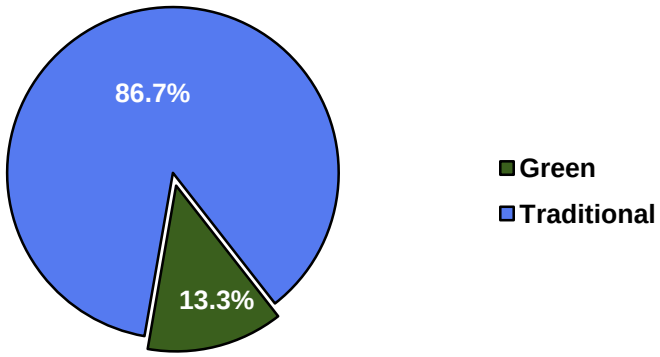
In sharp contrast to their reported revenues, respondents who work on green building projects are committing a greater percentage of their workforce to green projects. For this question, firms were asked, "of the XX [from question 1] permanent employees based out of your location, how many work on green building projects?" 50 percent of firms reported that 75 to 100 percent of their workers have worked on green projects, as illustrated in Figure 10. This may mean that despite slower revenue growth from green projects, green workers are still in demand.

Figure 10: Percentage of Workers who Work on Green Building Projects (Percentages among Firms that Work on Green Building Projects)



Based on the information gathered from these employers, 370 of the 1,176 firms with employees in the sampled industries have worked on green projects. Therefore, of the 17,325 total jobs in the region, 2,300, or 13.3 percent, involve green building projects.

Figure 11: Green Building Workers, Percent of Total



Of the 955 new jobs expected to be added by construction firms in the selected industries over the coming year, 232 are expected to involve work on green building projects. This means a 10.1 percent increase in the total number of green construction jobs over the next year.

OCCUPATIONAL GROWTH AND REPLACEMENTS

In addition to general employment trends, this report includes data gathered on six specific occupations that are most likely to be involved in green building projects. The occupations are

- home performance auditors, raters, or estimators;
- plumbers;
- insulation workers;
- electricians;
- HVAC technicians; and
- carpenters, including framers.

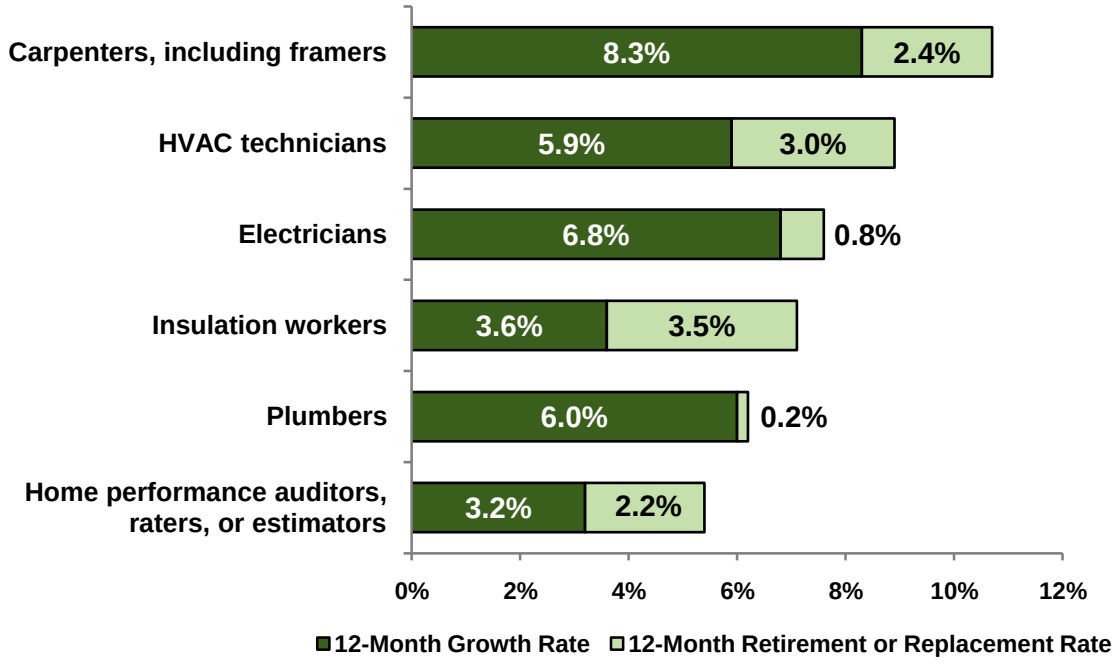
Table 2 below provides a summary of employment growth and replacement rates for the selected occupations, based on survey responses and using EMSI data as a 2010 baseline. Electricians, plumbers, and HVAC technicians are expected to have the most total openings from growth and replacements.

Table 2: Growth and Replacements by Occupation

Occupation	SOC Code	2010 Estimate	12-Month Growth Rate	12-Month Repl. Rate	Openings from Growth	Openings from Repl.	Total 12-Month Openings
Electricians	47-2111	2,885	6.8%	0.8%	196	23	219
Plumbers	47-2152	1,875	6.0%	0.2%	113	4	116
HVAC technicians	49-9021	1,192	5.9%	3.0%	70	36	106
Carpenters, including framers	47-2031	381	8.3%	2.4%	32	9	41
Home performance auditors, raters, or estimators	N/A	752	3.2%	2.2%	24	17	41
Insulation workers	47-2130	444	3.6%	3.5%	16	16	32
Summary		**7,529**			**451**	**105**	**555**

As illustrated in Figure 12 below, carpenters (11%) and HVAC technicians (9%) are expected to have the highest combined growth and replacement rates over the next 12 months, according to the survey results.

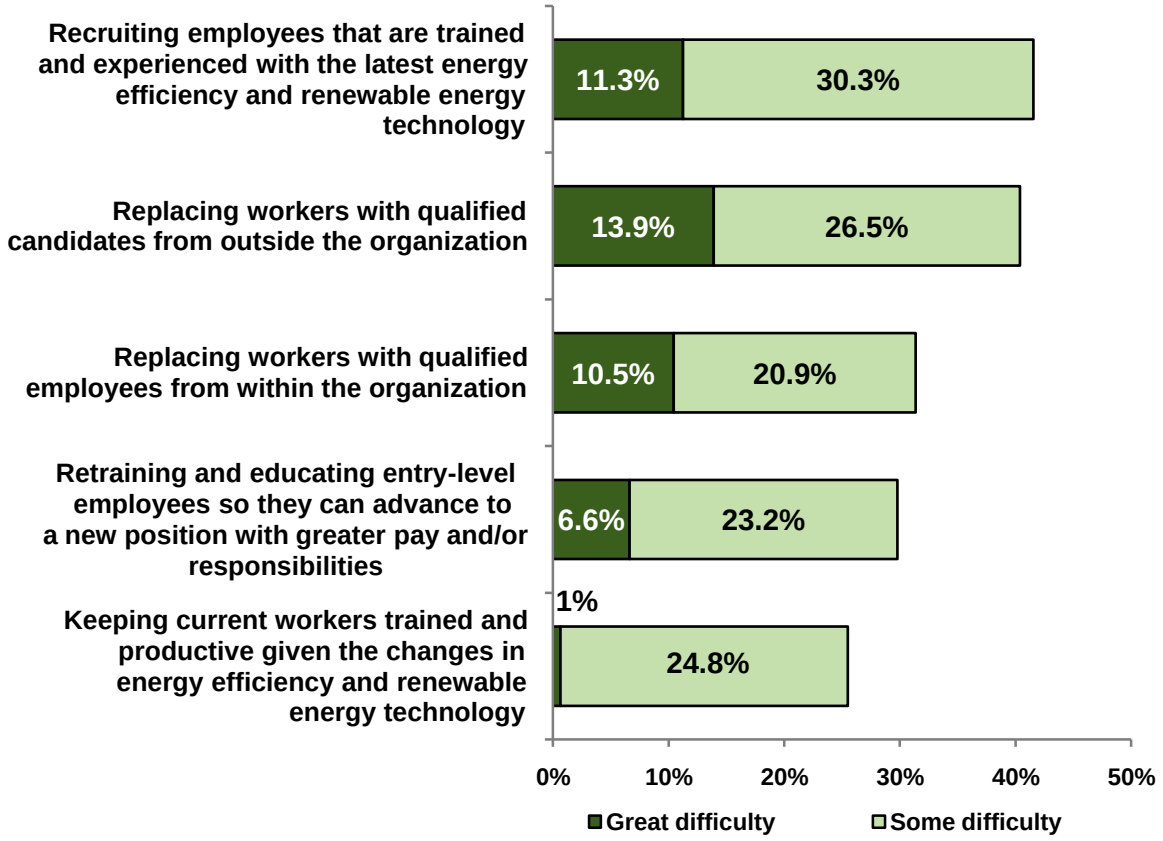
Figure 12: 12-Month Occupational Growth and Replacements



EMPLOYER PREFERENCES

Despite the high growth rates among the occupations studied, employers are not reporting significant difficulty in finding or retaining qualified applicants to meet their needs.

Figure 13: Employer Difficulties



However, given the high rates of unemployment—particularly in the construction industry—any difficulty is surprising, particularly when more than one in four firms report great difficulty in finding carpenters.

Figure 14: Employers Experiencing Hiring Difficulty, by Occupation

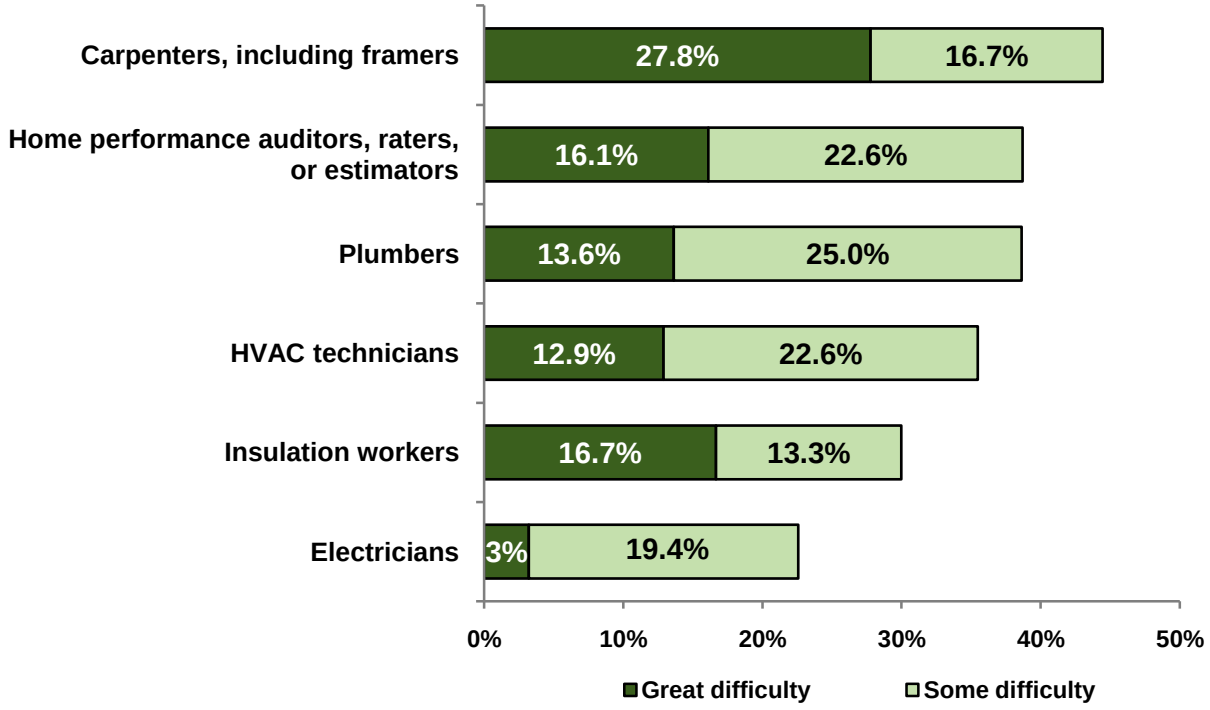
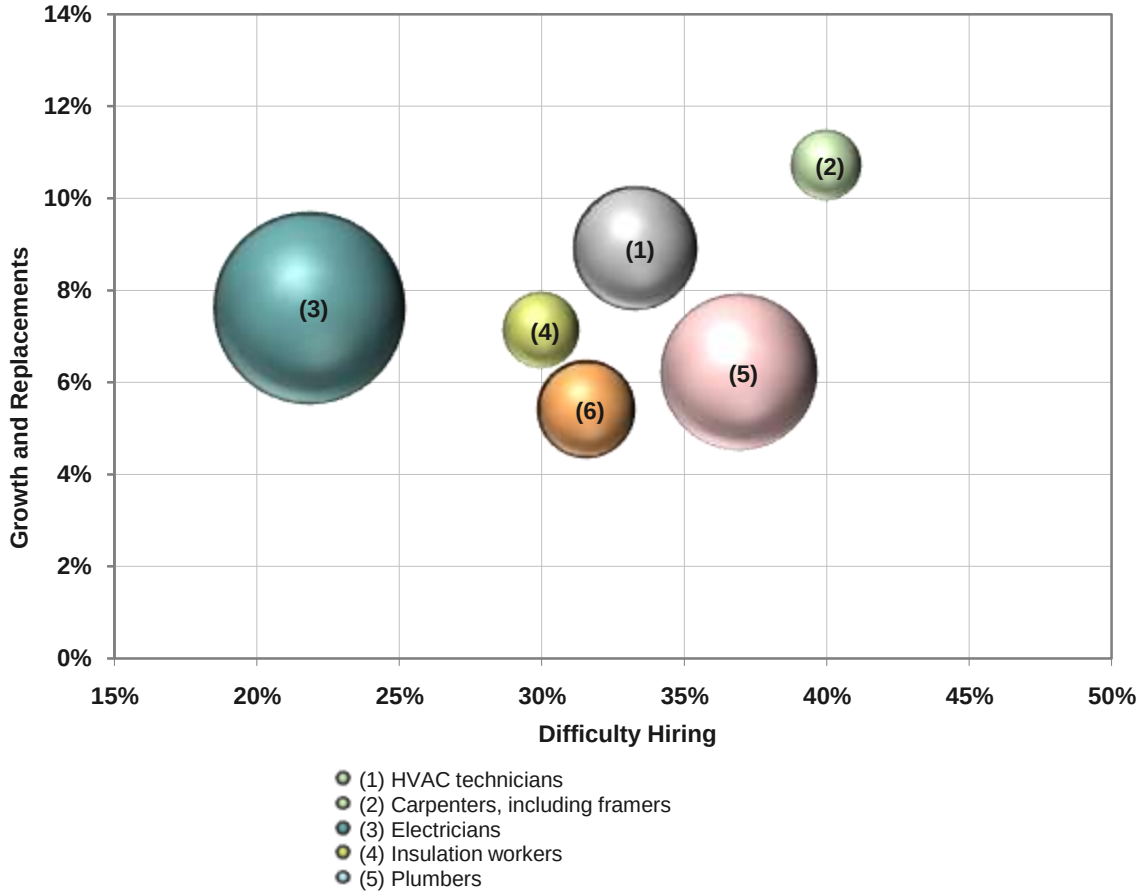


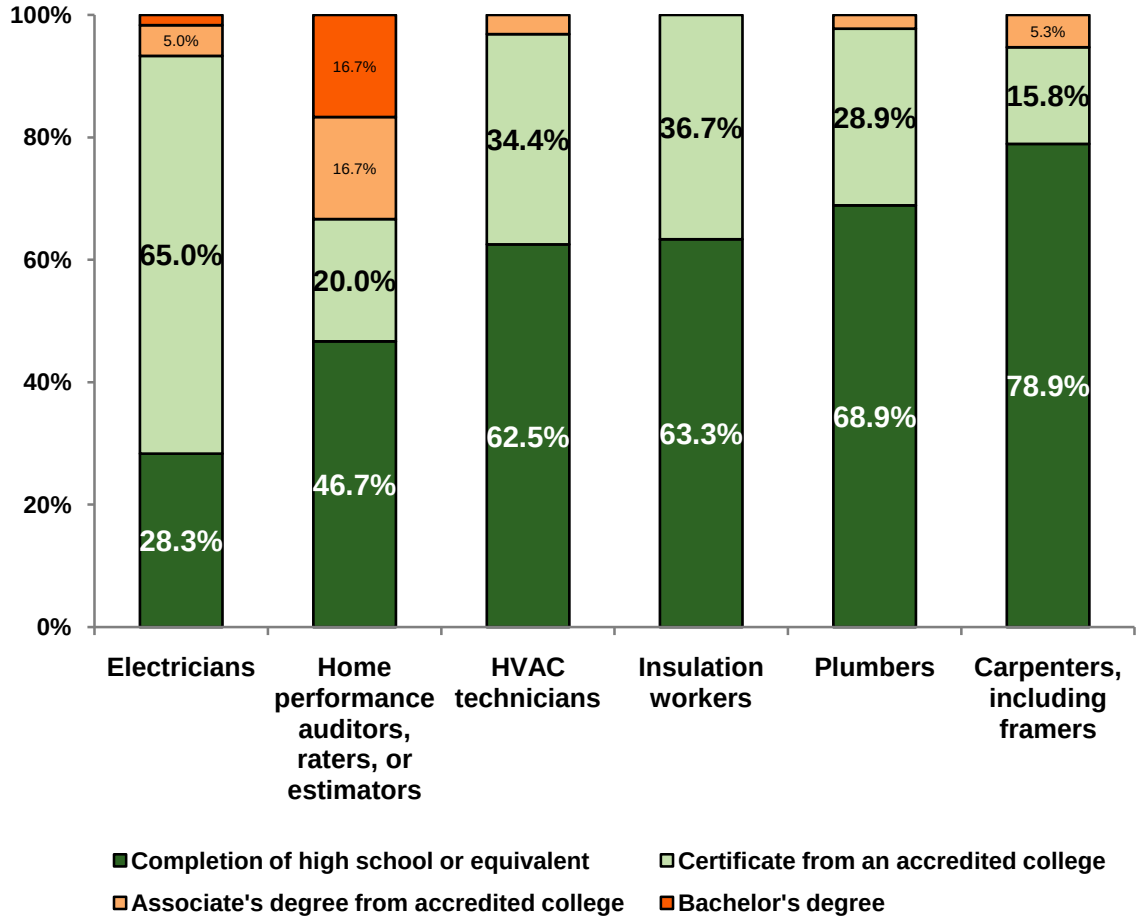
Figure 15 illustrates each occupation's total employment (bubble size), growth and replacement rate, and employers' difficulty hiring.

Figure 15: 12-Month Occupational Growth and Replacements, Difficulty Hiring, and Total Employment



Regarding educational attainment, the overwhelming majority of employers who provided an opinion[6] prefer only a high school diploma for entrance into four of the six occupations reviewed in this study. The major exceptions are for electricians, where a college certificate is preferred (65% prefer a college certificate and an additional 5% prefer a college degree), and home performance auditors, raters, and estimators, where employers showed very different preferences (nearly 47% reported H.S. diploma while nearly 17% reported a bachelor's degree).

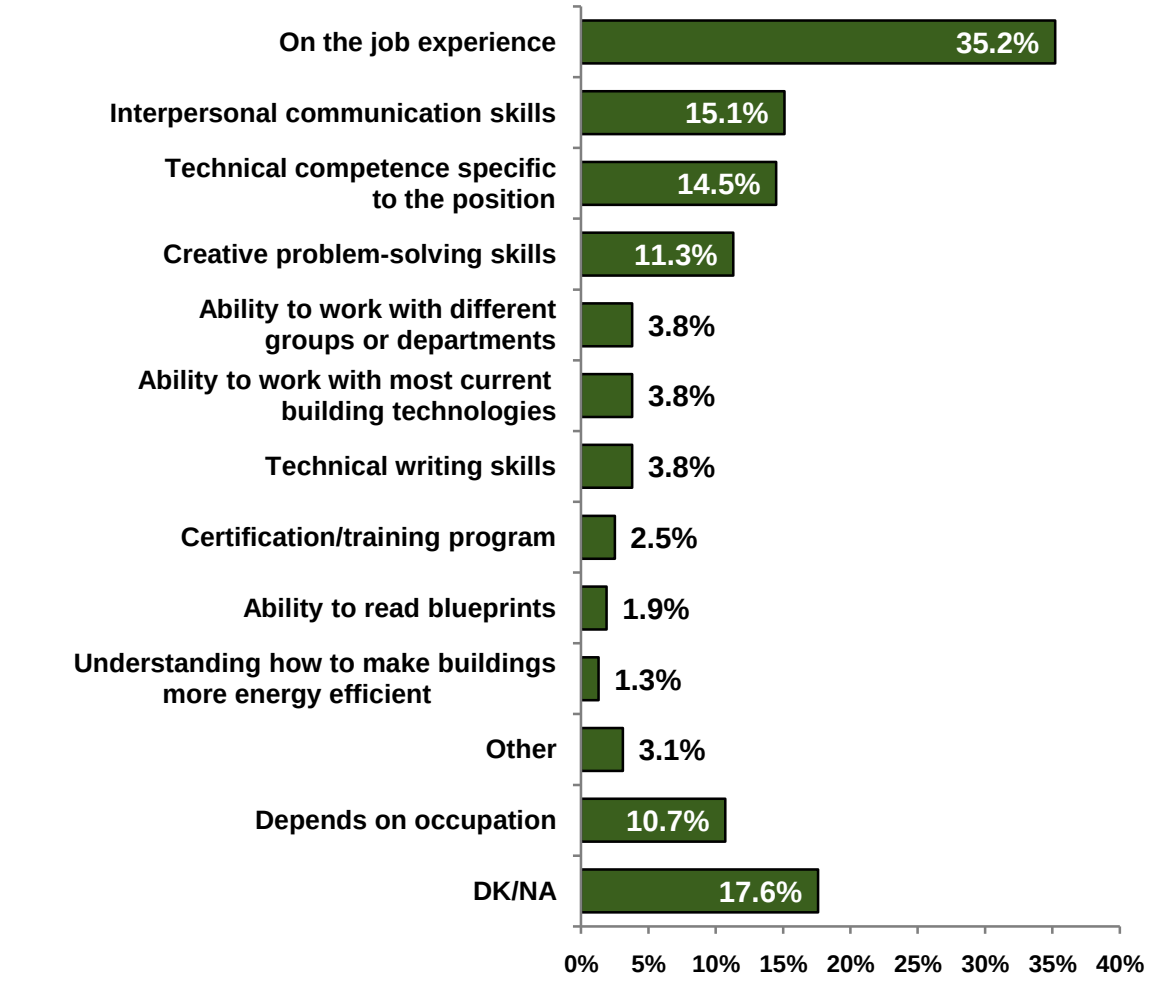
Figure 16: Educational Preferences



[6] Responses of don't know/no answer (DK/NA) were filtered out of for this question.

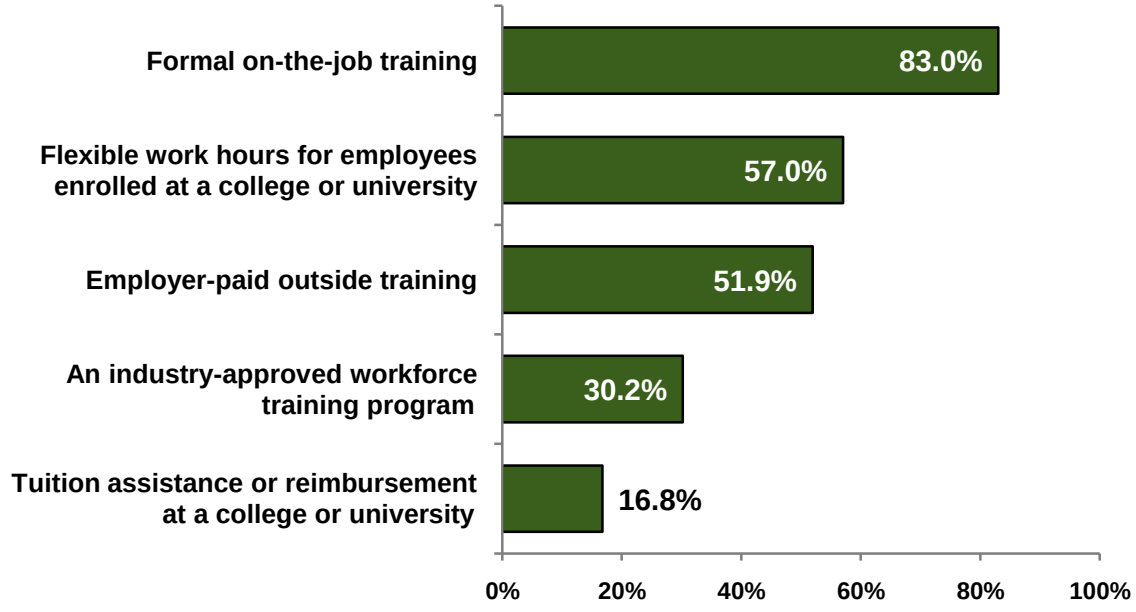
Employers were also asked about skill deficiencies in recent hires. As Figure 17 illustrates below, on-the-job experience is the biggest deficiency.

Figure 17: Employers ReportingSkill Deficiencies



In light of these deficiencies, it is perhaps not surprising that 83 percent of firms in the region are providing formal, on-the-job training. Employers are also clearly interested in classroom training, given that a majority of firms are paying for outside training and providing flexible work hours for employees enrolled in training.

Figure 18: Employer Training Preferences



CONCLUSIONS

This report finds that green construction is a small but growing segment of the greater construction industry. Over the last five years, construction firms have shed almost 40,000 jobs and only about one-third, or 13,000, of those jobs are expected to be recovered over the next five years through 2015. Of the 1,176 construction companies in the county from industries most likely to work on green building projects, 31 percent, or 370 of them, have worked on green projects. This translates to about 2,300 green building workers of the total 17,325 construction employees. Green construction jobs are expected to grow at a significantly faster rate of 10.1 percent over the next year, as opposed to a 5.5 percent overall rate among firms in the selected industries. However, due to its smaller base, employers expect only 232 of the 955 total new construction jobs to be green.

Employers are also facing limited difficulty finding certain types of workers, though their overall hiring difficulties are rather low. They report deficiencies in on-the-job skills as the largest issue, though some also report deficiencies in soft skills. To make up for these deficiencies, employers prefer formal on-the-job training, and a majority offer flexible schedules for training as well as paid outside training for their workers.

Based on the findings of this research, we recommend:

1) Coordinating with the California Center for Sustainable Energy, San Diego Gas and Electric, local municipalities, and others to promote existing green incentive programs. Despite all of the media attention to the green economy, 83 percent of construction firms surveyed could not name a single renewable energy or energy efficiency rebate or incentive program. No amount of green construction training money will remedy that fundamental obstacle, as much of the new, efficient equipment is only cost-competitive when the existing rebates and incentives are taken into account.

2) Working with employers in the region to ensure their knowledge of training programs at SDWP and Cuyamaca College. A majority of employers are already paying for outside training, as well as providing flexible work schedules for employees enrolled in training. Therefore, companies and their employees could benefit from grant-funded training opportunities—and SDWP and Cuyamaca can leverage these relationships to boost participation in their programs.

3) Providing on-the-job experience to green construction workers. Over 35 percent of employers indicated that new hires are deficient in hands-on training. SDWP and Cuyamaca should ensure that their programs provide sufficient experiential training.

As the nation struggles to pull itself out of recession, California and the San Diego cleantech cluster have an opportunity to channel their long-recognized environmental leadership into a model for economic growth and job creation. By promoting green construction and training a workforce ready to succeed in that industry, SDWP and Cuyamaca College can help build a new sustainable development model that provides high-quality jobs for skilled workers while combatting climate change, increasing energy efficiency, and lowering America's dependence on fossil fuels.

APPENDIX A: DATA SOURCES AND LIMITATIONS

The data sources and limitations for this report are listed below. Please note that all representations included herein have been produced from primary research and/or secondary review of publicly and/or privately available data and/or research reports. Efforts have been made to qualify and validate the accuracy of the data and the reported findings; however, neither Green LMI Consulting, nor any of its sub-contractors or affiliates, are responsible for applications or decisions made by recipients or their representatives based upon the same, including, but not limited to, and components, data, quotes, or recommendations contained herein.

Industry Data

In order to capture a complete picture of industry employment, EMSI basically combines covered employment data from Quarterly Census of Employment and Wages (QCEW) produced by the Department of Labor with total employment data in Regional Economic Information System (REIS) published by the Bureau of Economic Analysis (BEA), augmented with County Business Patterns (CBP) and Nonemployer Statistics (NES) published by the U.S. Census Bureau. Projections are based on the latest available EMSI industry data, 15-year past local trends in each industry, growth rates in statewide and (where available) sub-state area industry projections published by individual state agencies, and (in part) growth rates in national projections from the Bureau of Labor Statistics.

Occupation Data

Organizing regional employment information by occupation provides a workforce-oriented view of the regional economy. EMSI's occupation data are based on EMSI's industry data and regional staffing patterns taken from the Occupational Employment Statistics program (U.S. Bureau of Labor Statistics). Wage information is partially derived from the American Community Survey. The occupation-to-program (SOC-to-CIP) crosswalk is based on one from the U.S. Department of Education, with customizations by EMSI.

Location Quotient

Location quotient (LQ) is a way of quantifying how concentrated a particular industry, cluster, occupation, or demographic group is in a region as compared to the nation. It can reveal what makes a particular region unique in comparison to the national average.

Shift Share

Shift share is a standard regional analysis method that attempts to determine how much of regional job growth can be attributed to national trends and how much is due to unique regional factors.

State Data Sources

This report uses state data from the following agencies: California Labor Market Information Department.

APPENDIX B: METHODOLOGY

Methodology

APPENDIX C: SECONDARY DATA

Green LMI Consulting, Inc.

46 Northbridge Road

Mendon, MA 01756

Industry Report

Region Info

Region: San Diego County

County Areas: San Diego, California (6073)

Selected Industries

NAICS Code	Description
236118	Residential Remodelers
238161	Residential roofing contractors
238162	Nonresidential roofing contractors
238211	Residential electrical contractors
238212	Nonresidential electrical contractors
238221	Residential plumbing and HVAC contractors
238222	Nonresidential plumbing and HVAC contractors
238991	All other residential trade contractors
238992	All other nonresidential trade contractors

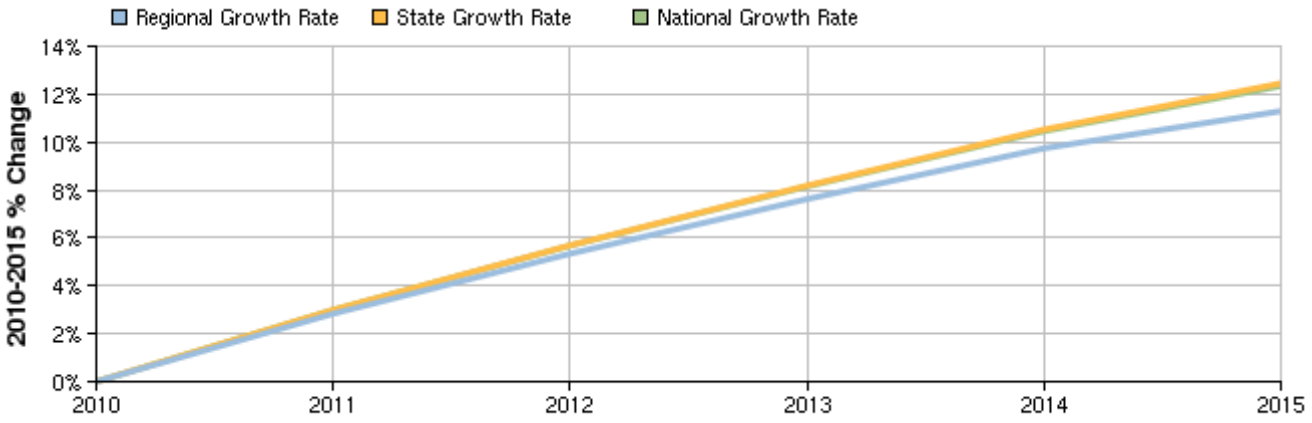
Executive Summary

Basic Information	
2010 Industry Jobs	31,615
2015 Industry Jobs	35,185
Total Change	3,570
Total % Change	11.29%
2010 Average Earnings per Worker	$66,196

Economic Indicators	
2010 Location Quotient	0.93
2015 Location Quotient	0.92
Shift Share: Regional Competitiveness Effect	-365
Shift Share: Industrial Mix Effect	1,537
Shift Share: National Effect	2,398

Source: EMSI Complete Employment - 4th Quarter 2010

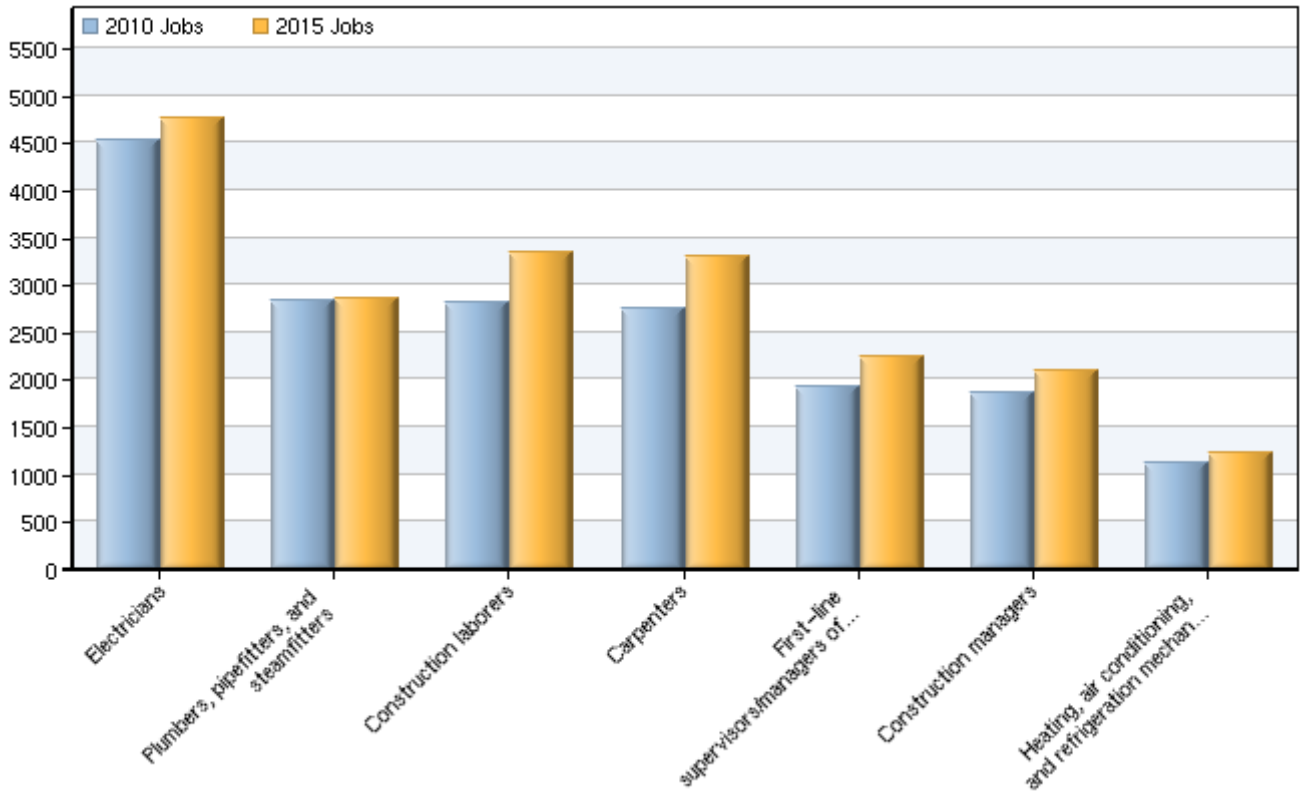
Industry Change Summary



Description	2010 Jobs	2015 Jobs	Change	% Change	2010 EPW	2010 Establishments
Regional Total	31,615	35,185	3,570	11%	$66,196	2,862
State Total	332,301	373,679	41,378	12%	$66,463	30,764
National Total	3,228,672	3,627,049	398,377	12%	$54,782	335,007

Source: EMSI Complete Employment - 4th Quarter 2010

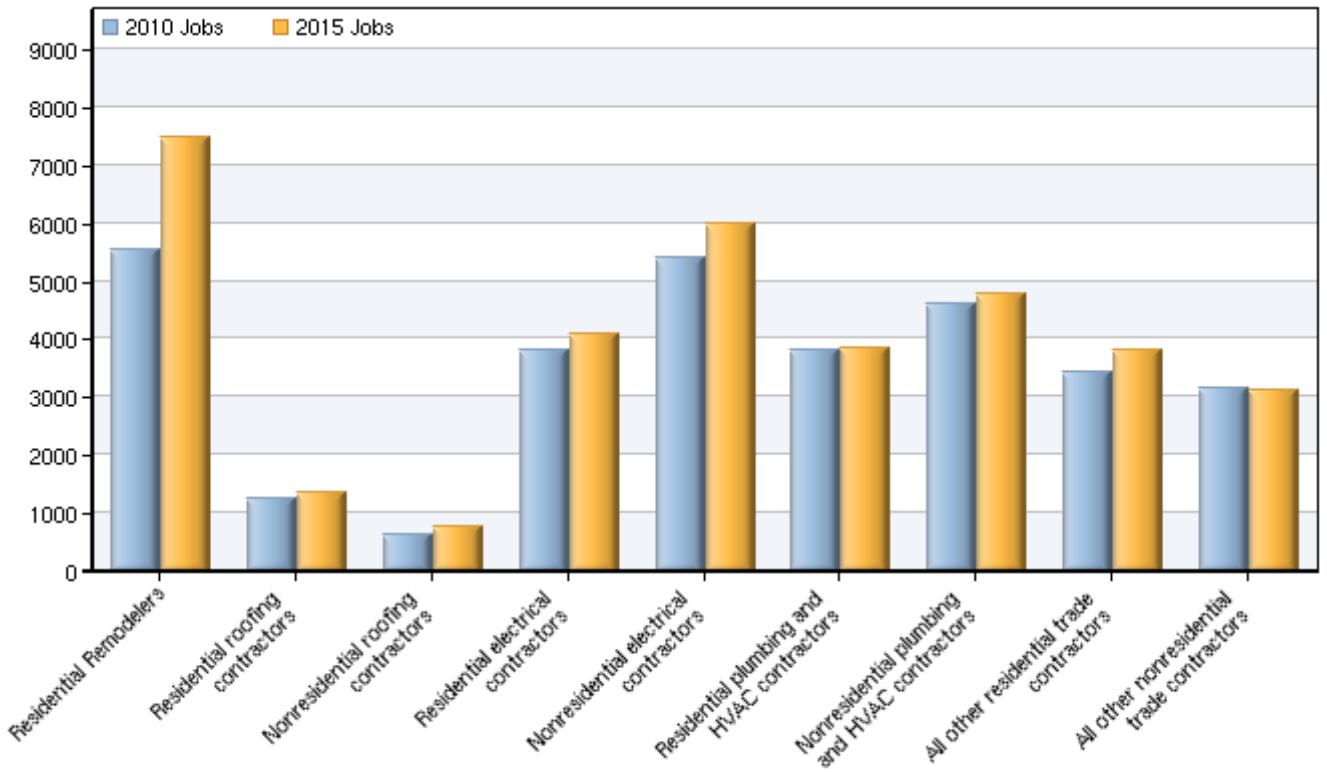
Top Occupations In Selected Industries



SOC Code	Name	2010 Jobs	2015 Jobs	Change	% Change
47-2111	Electricians	4,520	4,766	246	5%
47-2152	Plumbers, pipefitters, and steamfitters	2,831	2,860	29	1%
47-2061	Construction laborers	2,810	3,348	538	19%
47-2031	Carpenters	2,758	3,310	552	20%
47-1011	First-line supervisors/managers of construction trades and extraction workers	1,917	2,233	316	16%
11-9021	Construction managers	1,860	2,104	244	13%
49-9021	Heating, air conditioning, and refrigeration mechanics and installers	1,124	1,219	95	8%

Source: EMSI Complete Employment - 4th Quarter 2010

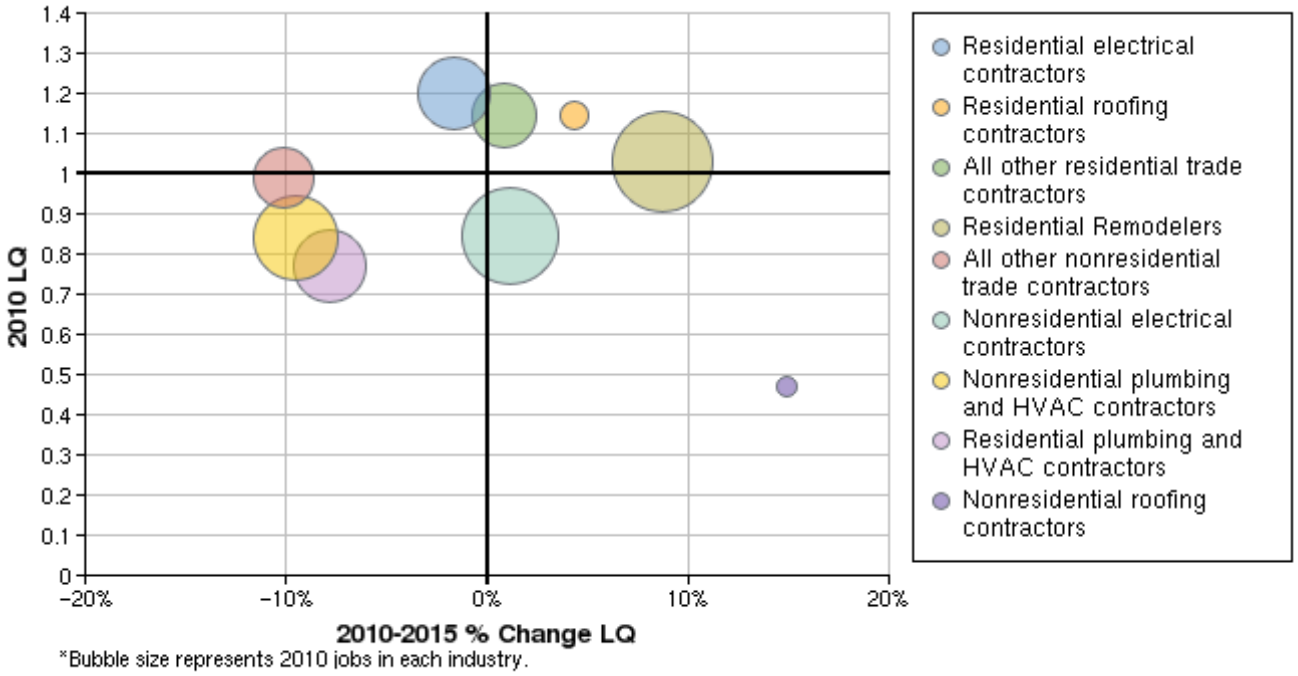
Industry Breakdown



NAICS Code	Description	2010 Jobs	2015 Jobs	2010 EPW	2010 Establishments
236118	Residential Remodelers	5,524	7,473	$67,284	770
238161	Residential roofing contractors	1,246	1,340	$45,006	158
238162	Nonresidential roofing contractors	606	759	$64,248	26
238211	Residential electrical contractors	3,822	4,087	$65,174	464
238212	Nonresidential electrical contractors	5,412	5,981	$77,957	292
238221	Residential plumbing and HVAC contractors	3,819	3,856	$57,405	550
238222	Nonresidential plumbing and HVAC contractors	4,588	4,772	$79,198	196
238991	All other residential trade contractors	3,439	3,815	$52,896	266
238992	All other nonresidential trade contractors	3,159	3,101	$60,330	139
	Total	31,615	35,185	$66,196	2,862

Source: EMSI Complete Employment - 4th Quarter 2010

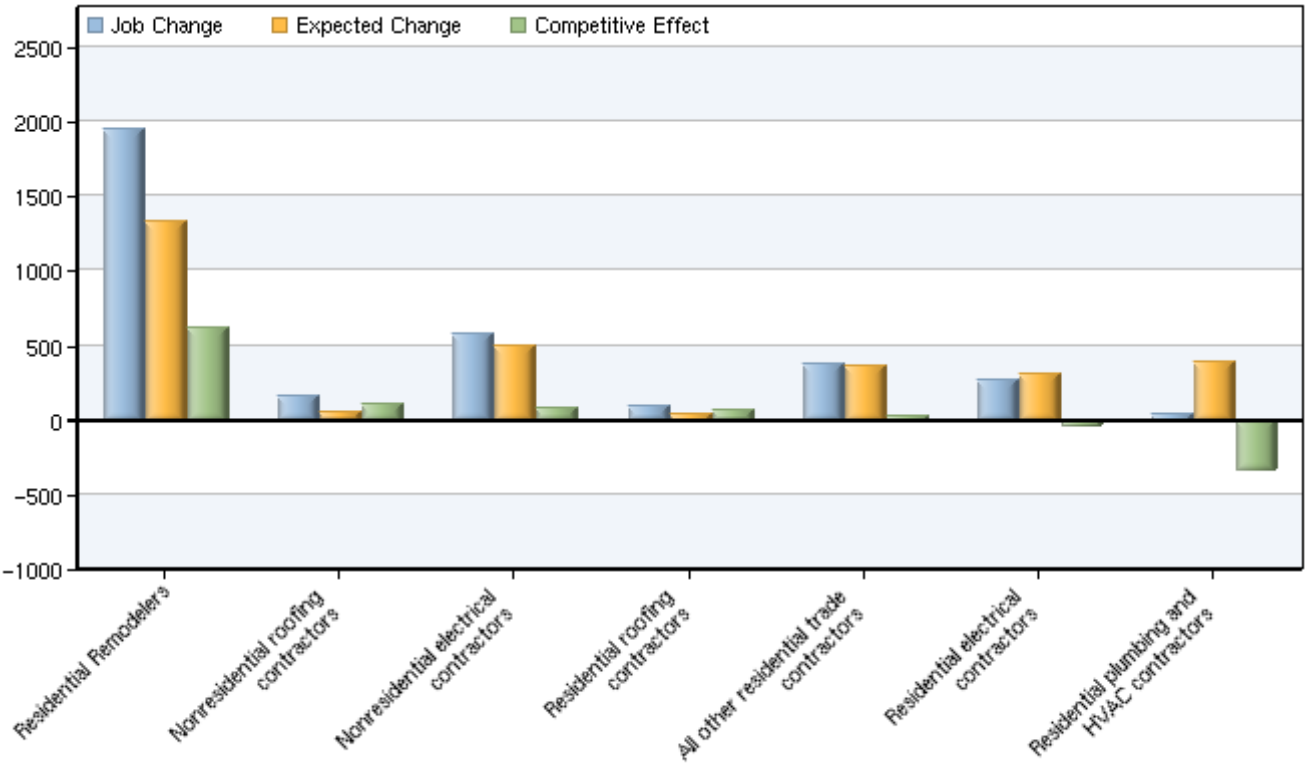
Location Quotient Breakdown



*Bubble size represents 2010 jobs in each industry.

NAICS Code	Description	2010 Jobs	2010 LQ	2015 LQ
238211	Residential electrical contractors	3,822	1.20	1.18
238161	Residential roofing contractors	1,246	1.15	1.20
238991	All other residential trade contractors	3,439	1.14	1.15
236118	Residential Remodelers	5,524	1.03	1.12
238992	All other nonresidential trade contractors	3,159	0.99	0.89
238212	Nonresidential electrical contractors	5,412	0.84	0.85
238222	Nonresidential plumbing and HVAC contractors	4,588	0.84	0.76
238221	Residential plumbing and HVAC contractors	3,819	0.77	0.71
238162	Nonresidential roofing contractors	606	0.47	0.54
	Total	31,615	0.93	0.92

Source: EMSI Complete Employment - 4th Quarter 2010



NAICS Code	Description	Job Change	Ind Mix Effect	Nat Growth Effect	Expected Change	Competitive Effect
236118	Residential Remodelers	1,949	915	419	1,334	614
238162	Nonresidential roofing contractors	153	3	46	49	104
238212	Nonresidential electrical contractors	569	79	410	489	79
238161	Residential roofing contractors	94	-60	94	34	60
238991	All other residential trade contractors	376	94	261	355	22
238211	Residential electrical contractors	265	18	290	308	-42
238221	Residential plumbing and HVAC contractors	37	91	290	381	-344
238992	All other nonresidential trade contractors	-58	52	240	292	-350
238222	Nonresidential plumbing and HVAC contractors	184	345	348	693	-509
	Total	3,569	1,537	2,398	3,935	-365

Source: EMSI Complete Employment - 4th Quarter 2010

APPENDIX D: SURVEY TOPLINES

[bw] RESEARCH PARTNERSHIP

San Diego County
Construction Employers (n=159)
November 2010
Preliminary Toplines

Construction Employer Study

Introduction:

Hello, my name is _____. May I please speak to [name] or the person handling staffing at [organization]?

Hello, my name is _____ and I'm calling on behalf of **the San Diego Workforce Partnership and Cuyamaca College**, who would like to have you participate in our study that will help address your organization's future needs for employees with construction skills and knowledge.

(If needed): The questions should take approximately ten minutes. By participating you can help the region's education and training system develop the appropriate type of programs to prepare the employees you will need in the future.

(If needed): This study has been commissioned by the San Diego Workforce Partnership and Cuyamaca College, which are committed to developing the region's workforce. The study is being conducted by BW Research, an independent research organization.

(If needed): Your individual responses will **not** be published; only aggregate information will be used in reporting the survey results.

PLEASE NOTE: TRADITIONAL ROUNDING RULES APPLIED

NOT ALL PERCENTAGES WILL EQUAL EXACTLY 100%

Area (from Sample):

36%	Central
6%	South
30%	East
28%	North

NAICS Title (from Sample):

1%	All other specialty trade contractors
33%	Electrical contractors
45%	Plumbing and HVAC contractors
8%	Residential remodelers
13%	Roofing contract

SECTION 1 - Organization-Related Questions

For this study we will just be asking about the employees that work from or directly report to your current location.

To begin I'll ask you a few general questions about your employees at your current location.

1. How many **permanent** employees, including all full-time and part-time, are based out of your current location?

Total full-time and part-time permanent employees	Mean	More Conservative Mean[7]	Median
3,374	21.35	17.33	8.00

Breakdown:

42%	5 or less employees
19%	6 to 10 employees
16%	11 to 24 employees
11%	25 to 49 employees
6%	50 to 99 employees
4%	100 to 249 employees
1%	250 or more employees
1%	(DON'T READ) DK/NA

2. Of those [TAKE Q1 #] permanent employees, how many are part-time?

Total part-time employees	Mean	Median
255	1.62	0.00

Percentage of permanent employees that are part-time:

67%	0 percent
4%	1 to 5 percent
7%	6 to 24 percent
6%	25 to 49 percent
4%	50 to 74 percent
10%	75 to 100 percent
1%	(DON'T READ) DK/NA

[7] With outliers (i.e. largest employers) removed: 2 firms with 300 or more employees.

Current Part-Time Employment
(Calculated by only examining employers with both full-time and part-time data)

	Total Permanent Employees (Full and Part-Time)	Part-Time Permanent Employees
n	157	157
Mean	21.41	1.62
Median	8.00	0.00
Total Employees	3,362	255
% Part-Time		**7.6%**

More Conservative Statistics on Current Part-Time Employment[8]
(Calculated by only examining employers with both full-time and part-time data)

	Total Permanent Employees (Full and Part-Time)	Part-Time Permanent Employees
n	155	155
Mean	21.34	1.29
Median	8.00	0.00
Total Employees	3,307	200
% Part-Time		**6.0%**

[8] With two outliers removed: firms with 25 or more part-time that account for 50% or more of their employees.

3. If you currently have [TAKE Q1 #] full-time and part-time **permanent** employees based out of your location, how many more or less permanent employees do you expect to have based out of your location 12 months from now?

   [If amount differs by 10% or more in either direction, ask:]
   Just to confirm, you currently have ____ permanent employees and you expect to have ____ (more/less) employees, for a total of ____ permanent employees 12 months from now.

30%	More permanent employees [record #_____]
4%	Less permanent employees [record #_____]
66%	(DON'T READ) Same number of permanent employees
1%	(DON'T READ) DK/NA

Expected Full-Time and Part-Time Permanent Employment in 12 months
(Calculated by only examining employers with both current and projected data)

	Current	12 months
n	156	156
Mean	21.37	23.19
Median	8.00	10.00
Total Employees	3,333	3,617
New Employees		**284**
% Growth		**8.5%**

More Conservative Statistics on Expected Full-Time and Part-Time Permanent Employment in 12 months[9]
(Calculated by only examining employers with both current and projected data)

	Current	12 months
n	153	153
Mean	18.25	19.26
Median	7.00	9.00
Total Employees	2,793	2,947
New Employees		**154**
% Growth		**5.5%**

[9] With three outliers removed: Firms adding 30 or more permanent employees.

4. How many **temporary or contract** employees are based out of your current location?

Total temporary or contract employees	Mean	More Conservative Mean[10]	Median
100	0.63	0.25	0.00

Breakdown:

92%	No temporary or contract employees
6%	5 or less temporary or contract employees
2%	6 to 10 temporary or contract employees
1%	11 or more temporary or contract employees
0%	(DON'T READ) DK/NA

5. If you currently have [TAKE Q4 #] **temporary or contract** employees based out of your location, how many more or less temporary or contract employees do you expect to have based out of your location 12 months from now?

[If amount differs by 10% or more in either direction, ask:]
Just to confirm, you currently have ____ temporary or contract employees and you expect to have _____ (more/less) employees, for a total of ____ temporary or contract employees 12 months from now.

4%	More temporary or contract employees [record #_____]
1%	Less temporary or contract employees [record #_____]
95%	(DON'T READ) Same number of temporary or contract employees
0%	(DON'T READ) DK/NA

[10] With outliers removed: 1 firm with 60 temporary or contract employees.

Expected Temporary or Contract Employment in 12 months
(Calculated by only examining employers with both current and projected data)

	Current	12 months
n	159	159
Mean	0.63	0.73
Median	0.00	0.00
Total Temporary or Contract Employees	100	116
New Temporary or Contract Employees		16
% Growth		**16.0%**

More Conservative Statistics on Expected Temporary or Contract Employment in 12 months[11]
(Calculated by only examining employers with both current and projected data)

	Current	12 months
n	158	158
Mean	0.60	0.65
Median	0.00	0.00
Total Temporary or Contract Employees	95	102
New Temporary or Contract Employees		**7**
% Growth		**7.4%**

[11] With one outlier removed: Firms adding 9 temporary or contract workers with growth of 180%.

6. Do you know the names of any energy efficiency incentive programs offered by the government? [DO NOT READ, ACCEPT FIRST TWO RESPONSES]

65%	No, I can not name any of these programs
6%	Home Star
4%	Energy Upgrade
2%	Title 24
2%	Tax credit
1%	Cash for Caulkers
1%	California Solar Incentive
3%	Other rebates
3%	Other (specify_____)
16%	DK/NA

SECTION 2 - Green Building Profile

Next, I would like to ask about your firm's experience with green building. For this discussion, green building can be generally defined as an organized effort to design and construct buildings using a process and materials that promote energy efficiency and environmental sustainability and can include renewable energy.

7. Has your company worked on any *green building* projects?

31%	Yes, our firm has worked on green building projects
65%	No, our firm has not worked on green building projects
4%	DK/NA [SKIP TO QUESTION 11]

Questions 8 – 10 Only Asked of Firms that Have Worked on Green Building Projects (n=50)

8. Approximately how much of your firm's work, in terms of total revenue, is focused on green building projects? [IF NEEDED: This includes renewable energy]

   Percentages among firms that have worked on green building projects (n=50)

14%	Most to all of it (76% to 100%)
6%	Half to three-quarters (50% to 75%)
24%	A quarter to almost half of it (25% to 49%)
52%	Less than a quarter (1% to 24%)
4%	(DON'T READ) DK/NA

9. Of the [TAKE Q1#] permanent employees based out of your location, how many work on green building projects? (Q9 SHOULD BE LESS THAN OR EQUAL TO Q1)

Statistics among firms that have worked on green building projects and provided data at Q9 (n=47)

Employees working on green building projects	Mean	More Conservative Mean[12]	Median
448	9.53	8.43	5.00

Breakdown:

[12] With outliers removed: 1 firm with 60 temporary or contract employees.

Percentages among firms that have worked on green building projects (n=50)

2%	0 percent
4%	1 to 5 percent
14%	6 to 24 percent
12%	25 to 49 percent
12%	50 to 74 percent
50%	75 to 100 percent
6%	DK/NA

Current Green Building Employment

(Calculated by only examining employers with both permanent and green building data)

Statistics among sub-set of firms (see sample size in first row).

For example, green building firms have an average of 9.53 permanent employees that work on green building projects (448 workers/ 47 green building firms). The average would be 2.84 green building workers across all construction firms (448 workers/ 158 firms[13]).

	Total Permanent Employees among All Firms	Total Permanent Employees at Green Building Firms	Total Permanent Employees that Work on Green Building Projects
n	158	47	47
Mean	21.35	28.89	9.53
Median	8.00	10.00	5.00
Total Employees	3,374	1,358	448
% Employees that Work on Green Building Projects	**13.3%**	**33.0%**	

[13] 158 used instead of the total sample size of 159 because 1 firm declined to provide employment data at Q1.

More Conservative Statistics on Current Green Building Employment[14] (Calculated by only examining employers with both permanent and green building data)

	Total Permanent Employees among All Firms	Total Permanent Employees at Green Building Firms	Total Permanent Employees that Work on Green Building Projects
n	158	45	45
Mean	21.35	28.64	8.42
Median	8.00	9.00	5.00
Total Employees	3,374	1,289	379
% Employees that Work on Green Building Projects	**11.2%**	**29.4%**	

[14] With two outliers removed: Firms with 32 or more green building employees that account for 100% of their permanent employees.

ASK Q10 IF Q3 = 1 (MORE EMPLOYEES)

10. Of the [TAKE Q3 #] new permanent employees you expect to have based out of your location 12 months from now, how many do you expect will work on green building projects? (Q10 SHOULD BE LESS THAN OR EQUAL TO Q3)

Statistics among firms that have worked on green building projects AND are adding new permanent employees and provided data at Q10 (n=20, small sample size)

For example, green building firms that are growing are adding an average of 3.95 permanent employees that will work on green building projects (79 workers/ 20 green building firms that are growing). The average would be 1.72 green building workers being added across all construction firms that are growing (79 workers/ 46 firms) and 0.50 among all construction firms regardless of growth (79 workers/ 158 firms).

	Total Permanent Employees Added by All Firms	Total Permanent Employees Added in Green Building Firms	Total Permanent Employees Added that Will Work on Green Building Projects (Subset of Previous Column)
n	46	20	20
Mean	7.07	6.40	3.95
Median	3.00	4.50	2.50
Total New Employees	325	128	79
% New Employees that Will Work on Green Building Projects	**24.3%**	**61.7%**	

SECTION 3 – Overall Green Building Workforce and Recruitment Needs

11. Now, I'm going to read a list of issues facing the region's construction workforce. Please tell me how much difficulty your location faces in addressing each workforce need.

    Here's the (first/next) one _____ (READ ITEM): Please tell me whether your location has no difficulty, some difficulty, or great difficulty in dealing with this issue.

RANDOMIZE

	No difficulty	Some difficulty	Great difficulty	(DON'T READ) DK/NA
A. Replacing workers with qualified employees within the organization	66%	20%	10%	4%
B. Replacing workers with qualified candidates from outside the organization	57%	25%	13%	5%
C. Keeping current workers trained and productive given the changes in energy efficiency and renewable energy technology	70%	23%	1%	6%
D. Recruiting employees that are trained and experienced with the latest energy efficiency and renewable energy technology	52%	27%	10%	11%
E. Retraining and educating entry-level employees so they can advance to a new position with greater pay and/or responsibilities	67%	22%	6%	5%

12. Next, I'd like to ask you about employee development practices at your location. As I read each of the following employee development practices, please indicate whether your location uses each practice.

RANDOMIZE

	Yes	No	(DON'T READ DK/NA
A. Formal on-the-job training	83%	17%	0%
B. Employer paid outside training	50%	47%	3%
C. Tuition assistance or reimbursement at a college or university	16%	81%	3%
D. Flexible work hours for employees enrolled at a college or university	53%	40%	6%
E. Industry-approved workforce training program, such as NABCEP, Building Performance Institute, or ISPQ certifications	26%	61%	13%

13. Thinking in general about recent hires at your firm, which of the following skills would you say recent hires tend to be **most deficient**?

    (For this question, we are interested in your general perception about skill deficiencies for recent hires across occupations at your location – DO NOT READ - ACCEPT FIRST TWO RESPONSES)

35%	On the job experience
15%	Interpersonal communication skills
14%	Technical competence specific to the position
11%	Creative problem-solving skills
4%	Ability to work with different groups or departments
4%	Ability to work with most current building technologies
4%	Technical writing skills
3%	Certification/ training program
2%	Ability to read blueprints
1%	Understanding how to make buildings more energy efficient
3%	Other (Please specify_____)
12%	Depends on occupation
19%	Don't know

SECTION 4 – Occupation-Related Questions

14. Now, I'm going to ask you about occupations within your organization. The occupational titles we are using may differ from the specific position titles used in your organization. For these questions, I would like you to try to equate your organization's specific position titles with the more general ones we will use here.

    Please only assign one occupation to each employee based out of your location.

    Please tell me if your organization employs, at your location, individuals in positions matching the following general occupational titles:

    Here's the (first/next) one: _____ (READ ITEM & BRIEF DEFINITION, THEN ASK): Do you have employees who fit this occupational description based out of your location? (1 = Yes, 2 = No, 3 =DK/NA)

    Occupational List (Read brief definition of occupation only if needed by respondent)

	Yes	No	(DON'T READ) DK/NA
A. HVAC technicians	21%	79%	0%
B. Carpenters, including framers	13%	86%	1%
C. Electricians	41%	58%	1%
D. Insulation workers	19%	81%	1%
E. Plumbers	31%	68%	1%
F. Home performance auditors, raters, or estimators	25%	73%	2%
G. Retrofit or weatherization technicians	8%	92%	1%

(SELECT UP TO 4 OF THE OCCUPATIONS THAT THE RESPONDENT INDICATED ARE REPRESENTED AT THEIR LOCATION IN Q15 –Q18 TO BE ASKED THE FOLLOWING OCCUPATIONAL QUESTIONS)

(READ THE OCCUPATIONS IN THE SAME ORDER FOR EACH OF THE OCCUPATION-SPECIFIC QUESTIONS: Q15 – Q18)

Next I'm going to ask you a few questions about some of the occupations you mentioned, including _____ (READ LIST OF OCCUPATIONS TO BE USED)

15. As I read each of the following occupations, please tell me how many individuals you have based out of your location that are currently employed either full-time or part-time in this occupation.

[CREATE INTERNAL CONTROL SO THAT THE COMBINED OCCUPATIONAL EMPLOYMENT IS NOT MORE THAN Q1 + Q4 OVERALL EMPLOYMENT]

Small sample size for two of the seven occupations is less than 25 - caution generalizing their results.

Current Employment:

	HVAC technicians	Carpenters, including framers¥	Electricians	Insulation workers
n	33	20	63	29
Mean	8.39	2.45	14.90	4.97
Conservative Mean[15]	5.84		8.75	
Median	3.00	2.00	5.00	2.00
Total Employees	277	49	939	144

	Plumbers	Home performance auditors, raters, or estimators	Retrofit or weatherization technicians¥
n	46	37	12
Mean	9.43	2.54	6.50
Conservative Mean	6.09		
Median	3.00	2.00	3.50
Total Employees	434	94	78

[15] With outliers (i.e. largest occupational employers) removed.

¥ Small sample size – caution generalizing the results.

16. Thinking about the current number of individuals you have in each of the occupations, I would like to know how many you expect will retire or need to be replaced for other reasons in the next 12 months.

Use the following format for each one:

> If you currently have [TAKE Q15 #] [INSERT OCCUPATION TITLE] _____ based out of your location, how many do you expect will retire or need to be replaced for other reasons over the next 12 months?

Small sample size for two of the seven occupations is less than 25 - caution generalizing their results.

	HVAC technicians		**Carpenters, including framers**[¥]	
	Current	Number expect to retire or replace over next 12 months	Current	Number expect to retire or replace over next 12 months
n	32	32	19	19
Mean	7.41	0.22	2.16	0.05
Median	3.00	0.00	2.00	0.00
Total Employees	237	7	41	1
% Expect to retire or replace over next 12 months		**3.0%**		**2.4%**

	Electricians		**Insulation workers**	
	Current	Number expect to retire or replace over next 12 months	Current	Number expect to retire or replace over next 12 months
n	61	61	29	29
Mean	14.95	0.11	4.97	0.17
Median	5.00	0.00	2.00	0.00
Total Employees	912	7	144	5
% Expect to retire or replace over next 12 months		**0.8%**		**3.5%**

	Plumbers		**Home performance auditors, raters, or estimators**	
	Current	Number expect to retire or replace over next 12 months	Current	Number expect to retire or replace over next 12 months
n	45	45	35	35
Mean	9.58	0.02	2.57	0.06
Median	3.00	0.00	2.00	0.00
Total Employees	431	1	90	2

% Expect to retire or replace over next 12 months	**0.2%**	**2.2%**

Retrofit or weatherization technicians[¥]

	Current	Number expect to retire or replace over next 12 months
n	11	11
Mean	6.64	0.18
Median	2.00	0.00
Total Employees	73	2
% Expect to retire or replace over next 12 months		**2.7%**

17. As I read each of the occupations again, please tell me how many either more or less employees you estimate will be employed in each of the occupations 12 months from now.

Use the following format for each one:

If you currently have [TAKE Q15 #] [INSERT OCCUPATION TITLE] _____ based out of your location, how many more or less [INSERT OCCUPATION TITLE] do you expect to have based out of your location 12 months from now?

[If amount differs by 10% or more in either direction, ask:]
Just to confirm, you currently have ____ (insert occupation title) and you expect to have _____ (more/less), for a total of ____ (insert occupation title) 12 months from now.

Small sample size for two of the seven occupations is less than 25 - caution generalizing their results.

	More	Less	Same
A. HVAC technicians (n=33)	36%	3%	61%
B. Carpenters, including framers (n=20)	20%	5%	75%
C. Electricians (n=64)	23%	5%	72%
D. Insulation workers (n=30)	13%	0%	87%
E. Plumbers (n=46)	20%	2%	78%
F. Home performance auditors, raters, or estimators (n=38)	8%	0%	92%
G. Retrofit or weatherization technicians (n=12)	25%	0%	75%

[¥] Small sample size – caution generalizing the results.

Expected Employment by Occupation in 12 months
(Calculated by only examining employers with both current and projected data)

	HVAC technicians		Carpenters, including framers[¥]	
	Current	12 months	Current	12 months
n	33	33	20	20
Mean	8.39	8.97	2.45	2.75
Median	3.00	3.00	2.00	2.00
Total Employees	277	296	49	55
New Employees		**19**		**6**
% Growth		**6.9%**		**12.2%**
% Conservative Growth		**5.9%**		**8.3%**

	Electricians		Insulation workers	
	Current	12 months	Current	12 months
n	62	62	29	29
Mean	14.74	16.58	4.97	5.45
Median	4.50	5.00	2.00	3.00
Total Employees	914	1,028	144	158
New Employees		**114**		**14**
% Growth		**12.5%**		**9.7%**
% Conservative Growth		**6.8%**		**3.6%**

	Plumbers		Home performance auditors, raters, or estimators	
	Current	12 months	Current	12 months
n	45	45	37	37
Mean	9.62	10.33	2.54	2.62
Median	3.00	3.00	2.00	2.00
Total Employees	433	465	94	97
New Employees		**32**		**3**
% Growth		**7.4%**		**3.2%**
% Conservative Growth		**6.0%**		N/A

	Retrofit or weatherization technicians[¥]	
	Current	12 months

[¥] Small sample size – caution generalizing the results.

n	12	12
Mean	6.50	6.92
Median	3.50	4.50
Total Employees	78	83
New Employees		**5**
% Growth		**6.4%**
% Conservative Growth		**3.9%**

18. For the same list of occupations, I'm interested in the level of difficulty your location has in finding entry-level applicants who meet the organization's hiring standards. As I read each occupation, please tell me whether your location has no difficulty, some difficulty, or great difficulty finding qualified entry-level applicants. (PRESENT IN ORDER THEY WERE PREVIOUSLY PRESENTED)

Small sample size for two of the seven occupations is less than 25 - caution generalizing their results.

	No difficulty	Some difficulty	Great difficulty	(DON'T READ) DK/NA
A. HVAC technicians (n=33)	61%	21%	12%	6%
B. Carpenters, including framers (n=20)	50%	15%	25%	10%
C. Electricians (n=64)	75%	19%	3%	3%
D. Insulation workers (n=30)	70%	13%	17%	0%
E. Plumbers (n=46)	59%	24%	13%	4%
F. Home performance auditors, raters, or estimators (n=38)	50%	18%	13%	18%
G. Retrofit or weatherization technicians (n=12)	67%	8%	0%	25%

19. Now, for the same list of occupations, I'd like to know the ***typical*** education requirements for successful applicants within each occupation. The categories are (READ OPTIONS). As I read each occupation, please indicate the typical education requirement for that occupation.

1 Completion of high school or equivalent
2 Certificate from an Accredited College
3 Associate's Degree from Accredited College
4 Bachelor's Degree (B.A., B.S.)
5 Master's or other Graduate Degree (M.A., M.S., MPA, MBA, Ph.D., J.D.)
6 (DON'T READ) DK/NA

Small sample size for two of the seven occupations is less than 25 - caution generalizing their results.

	1	2	3	4	5	DK/NA
A. HVAC technicians (n=33)	61%	33%	3%	0%	0%	3%
B. Carpenters, including framers (n=20)	75%	15%	5%	0%	0%	5%
C. Electricians (n=64)	27%	61%	5%	2%	0%	6%
D. Insulation workers (n=30)	63%	37%	0%	0%	0%	0%
E. Plumbers (n=46)	67%	28%	2%	0%	0%	2%
F. Home performance auditors, raters, or estimators (n=38)	37%	16%	13%	13%	0%	21%
G. Retrofit or weatherization technicians (n=12)	58%	17%	0%	8%	0%	17%

Before we finish, I'd like to ask you a general question and verify your contact information.

20. Are you interested in receiving information from the San Diego Workforce Partnership and Cuyamaca College, including the findings of this research?

33%	Yes
67%	No
0%	(DON'T READ) DK/NA

Thank you for completing the survey. Since it sometimes becomes necessary for the project manager to call back and confirm responses to certain questions, I would like to verify your contact information.

A. First and Last Name of Respondent _____

B. Position of Respondent _____

C. Phone of Respondent _____

D. Email of Respondent_____

E. Name of Organization_____

F. Address of Organization (including City) _____

Those are all the questions I have.
Thank you very much for your time.

G. Date of Interview _____

H. Time of Interview _____

I. Name of Interviewer _____

J. County _____

K. Primary NAICS _____